

**WHAT IS CLAIMED IS:**

1. A surface acoustic wave (SAW) identification tag,  
2 comprising:

3 a piezoelectric substrate having a SAW transducer located  
4 thereon;

5 a group of slots arranged by both pulse position and phase  
6 position on said substrate; and

7 a number of reflectors distributed among said slots such that  
8 said reflectors encode a number by both pulse position and phase  
9 position.

10 2. The SAW identification tag as recited in Claim 1 wherein  
11 said reflectors are arranged wherein said phase position is in  
12 quadrature.

13 3. The SAW identification tag as recited in Claim 1 further  
14 comprising a framing reflector located between said SAW transducer  
15 and said group.

16 4. The SAW identification tag as recited in Claim 1 further  
17 comprising a plurality of said groups separated by dead spaces.

18 5. The SAW identification tag as recited in Claim 1 wherein

2     said number is at least 8 bits long.

6.     The SAW identification tag as recited in Claim 4 wherein  
2     said plurality of groups is at least four and said number is at  
3     least 32 bits long.

7.     The SAW identification tag as recited in Claim 4 wherein  
2     said plurality of groups is at least twelve and said number is at  
3     least 96 bits long.

8.     The identification tag as recited in Claim 1 wherein said  
SAW transducer is configured to produce a SAW having a frequency of  
between two and three gigahertz.

9.     The identification tag as recited in Claim 1 wherein at  
least some of said reflectors are single strips of conductive  
material.

10.    The identification tag as recited in Claim 1 wherein said  
2     number is unique to said tag.

11.    The identification tag as recited in Claim 1 wherein said  
2     number contains data pertaining to an object associated with said  
3     tag.



13. A method of operating a surface acoustic wave (SAW)  
identification tag, comprising:

exciting a SAW transducer located on a piezoelectric substrate  
to create a SAW;

causing said SAW to reflect from reflectors distributed among  
a group of slots arranged by both pulse position and phase position  
on said substrate; and

demodulating reflected portions of said SAW to yield a number  
encoded by both pulse position and pulse position.

14. The method as recited in Claim 13 wherein four of said  
sub-slots are arranged wherein said phase position is in  
quadrature.

15. The method as recited in Claim 13 further comprising  
causing said SAW to reflect from a framing reflector located  
between said SAW transducer and said group.

16. The method as recited in Claim 13 further comprising  
causing said SAW to reflect from reflectors distributed among a  
plurality of said groups separated by dead spaces.

17. The method as recited in Claim 13 wherein said number is  
at least 8 bits long.

18. The method as recited in Claim 16 wherein said plurality  
of groups is at least four and said number is at least 32 bits  
long.

19. The method as recited in Claim 16 wherein said plurality  
of groups is at least twelve and said number is at least 96 bits  
long.

20. The method as recited in Claim 13 wherein said SAW has a  
frequency of between two and three gigahertz.

21. The method as recited in Claim 13 wherein at least some  
of said reflectors are single strips of conductive material.

22. The method as recited in Claim 13 wherein said number is  
unique to said tag.

23. The method as recited in Claim 13 wherein said number  
contains data pertaining to an object associated with said tag.

24. The method as recited in Claim 13 wherein said number  
includes an error detection portion.

25. A method of manufacturing a surface acoustic wave (SAW)  
2 identification tag, comprising:

3 forming a SAW transducer on a piezoelectric substrate; and  
4 depositing reflectors among a group of slots arranged by both  
5 pulse position and phase position on said substrate, said  
6 reflectors encoding a number by both pulse position and phase  
7 position.

26. The method as recited in Claim 25 wherein said reflectors  
are arranged wherein said phase position is in quadrature.

27. The method as recited in Claim 25 further comprising  
depositing a framing reflector between said SAW transducer and said  
group.

28. The method as recited in Claim 25 further comprising a  
plurality of said groups separated by dead spaces.

29. The method as recited in Claim 25 wherein said number is  
2 at least 8 bits long.

30. The method as recited in Claim 28 wherein said plurality  
2 of groups is at least four and said number is at least 32 bits  
3 long.

31. The method as recited in Claim 28 wherein said plurality  
2 of groups is at least twelve and said number is at least 96 bits  
3 long.

32. The method as recited in Claim 25 wherein said SAW  
2 transducer is configured to produce a SAW having a frequency of  
3 between two and three gigahertz.

33. The method as recited in Claim 25 wherein at least some  
of said reflectors are single strips of conductive material.

34. The method as recited in Claim 25 wherein said number is  
unique to said tag.

35. The method as recited in Claim 25 wherein said number  
contains data pertaining to an object associated with said tag.

36. The method as recited in Claim 25 wherein said number  
2 includes an error detection portion.